

**METHOD AND APPARATUS FOR USING A TWO-WAVE MIXING  
ULTRASONIC DETECTION IN RAPID SCANNING APPLICATIONS**

**ABSTRACT**

The invention is directed to a wave characteristic adjusting device used to  
5 compensate for a wave characteristic distortion caused by the scanning motion of a probe  
beam of a two-wave mixing interferometer. The invention is also directed to an apparatus  
and method for using the wave characteristic adjusting device in a rapid scanning laser  
ultrasound testing device. In a rapid scanning laser ultrasound testing device, a laser pulse  
is directed at periodic points along a path across the surface of a manufactured object. The  
10 laser pulse initiates an ultrasonic signal associated with the manufactured object. An  
interferometer may be used to measure the initiated ultrasonic signal. The interferometer  
scans a probe beam along a path similar to the sonic initiating laser. A pulse of the probe  
beam is directed at the manufactured object in the vicinity of the initiating laser pulse  
while continuously scanning. As a result, the probe beam pulse may exhibit a Doppler  
15 shift. This Doppler shift may cause a loss in sensitivity of the two-wave mixing  
interferometer. The wave characteristic adjusting device may be used to compensate for  
the Doppler shift, thereby improving the sensitivity of the two-wave mixing  
interferometer.